**ASPD NYSunworks Sustainability Course: 134-0098.1M17 Summer 2017**

**Instructor: Shakira Provasoli Student: Surzi Duplan**

**Lesson Plan: Zero Waste (Grade-level 6th)**

**Background Information/Introduction:** Due to significant ‘waste problems’

In our school’s system, student will be participating in three hands-on, project-based lessons, which will develop their awareness of the field of sustainable packaging. Students will become aware of the problems we face because of over-packaging including overcrowded landfills, needless use of energy and natural resources, and litter. They will learn the three R’s of responsible waste management – reduce, reuse and recycle. They will also learn that some packaging is necessary and while it is best to reduce where possible, some packaging must exist in order to keep products fresh, safe and transportable. They’ll find out about innovations in packaging and how sustainable packaging uses less energy to produce. They’ll learn that when it’s ready to be discarded, it will cause less harm to our Earth.

**Lesson 1-Packaging 101**

Science Standards (National Science Standards)

* Understanding about scientific inquiry
* Properties of objects and materials
* Populations and ecosystems
* Distinguish between natural and human-made objects
* Understanding about science and technology
* Populations, resources, and environments
* Natural hazards
* Science and technology in society

Mathematics (Mathematic Common Core Standards)

* Represent and interpret data

SOCIAL STUDIES (National Standards for Social Studies)

* Science, technology and society

**Lesson 2 – Lunch Weigh In**

SCIENCE STANDARDS (National Science Standards)

* Understanding about scientific inquiry
* Properties of objects and materials
* Distinguish between natural and human-made objects
* Understanding about science and technology
* Populations, resources, and environments
* Risks and benefits
* Science and technology in society

MATHEMATICS (Mathematic Common Core Standards)

* Solve problems using the four operations
* Represent and solve problems using multiplication and division
* Generate and analyze patterns
* Represent and interpret data

SOCIAL STUDIES (National Standards for Social Studies)

* Science, technology and society.

**Lesson 3 – Trash Pie**

SCIENCE STANDARDS (National Science Standards)

* Understanding about scientific inquiry
* Properties of objects and materials
* Distinguish between natural and human-made objects
* Understanding about science and technology
* Populations, resources, and environments
* Risks and benefits
* Science and technology in society

MATHEMATICS (Mathematic Common Core Standards)

* Solve problems using the four operations
* Generate and analyze patterns
* Represent and interpret data

SOCIAL STUDIES (National Standards for Social Studies)

* Science, technology and society
* Production, distribution and consumption

ENGLISH LANGUAGE ARTS (ELA Common Core Standards)

* Integration of knowledge and ideas

**Lesson 1- Packaging 101 Description:** In this lesson students will think outside of the box while they’re introduced to topic of sustainable packaging. They learn the benefits of packaging and the three rules of sustainable living – Reduce, Reuse and Recycle.

Learning Objectives

• Students will identify different kinds of packages

• Students will understand that certain packages can be recycled

• Students will research some environmental problems caused by packaging

• Students will explore practices that go into sustainable packaging and understand why sustainable packaging is less harmful to the environment

Overview: Packaging is all around us. Almost everything we buy and use comes packaged. While students come into contact with packaging every day, they likely do not think about the You will need to read about the recycling rules in your community to guide students to understand what can and what cannot be recycled. Look up what the different recycling symbols mean and share the information with your students. Then tell them which symbols can packaging they are using or its potential impact on the environment. Used, empty packaging makes up more than two thirds of what we throw away. Much of what students buy is over-packaged. More packaging is used than is needed to protect or transport the product. Yet some packaging is necessary to keep food products from rotting and other products from breaking. In this lesson, students learn the basics of packaging and are introduced to the concept of sustainable packaging.

What We Need

* Different kinds of packaging that students bring from home
* Tables for sorting
* Packaging Life Cycle Loop graphic (see page 6)
* Markers for signs Package Investigation Worksheet

**Pre-Activity:** (Day before the Lesson Begins)

Class read about the recycling rules in our community to guide students to understand what can and what cannot be recycled. Look up what the different recycling symbols mean and share the information with your students. Then tell them which symbols can be recycled locally.

1. Ask students to bring in a variety of packages from their homes.
2. Set up a K-W-L chart to find out what students KNOW, what they WANT to know, and, at the end of the lesson, what they have LEARNED.
3. Ask them to talk about what they already know about packaging. Ask probing questions such as:

* What kinds of products do you buy in packages?
* What is the point of packaging? How does it help the products?
* Why would one product use one kind of packaging and a different product use a different kind of packaging? Is all packaging the same? What makes it the same or different?
* What kind of information is printed on packages? Why is it there?

What do you think is meant by the term “over-packaging”?

**Lesson Activities (Students are grouped to complete their tasks/works)**

1. The Packaging Life Cycle Loop graphic is shown to students. Explain the term “life cycle” by comparing it to the life cycle of a butterfly or even a human. Then point out each stage in a package’s life cycle as illustrated in the graphic. Introduce the term “sustainable packaging” Sustainable packaging is safe and healthy for the community at every stage of the package’s life cycle. This means using less energy and fewer resources to make the package. It also means that the package won’t end up polluting the environment when it’s done being used. Perhaps the package can be composted or recycled, or maybe it can even be used for something else.
2. The packages students have brought are lay out on tables or desks. Students have to wear latex gloves to handle the packages in case any have not been cleaned. Then, they look at the different packages.
3. The class is being address for some volunteers to create six signs. (You could use cardboard from the packages to make them.) The signs should say; Paper; Plastic; Metal; Glass; Mixed; Other. Set up the signs around the sorting table.
4. Students are giving time to sort through the different packages. Then they allow picking packages and bringing them to the area where they belong, according to their signs. Have them keep going until all the packages have been sorted.
5. Look through each of the piles and discuss the packages. Which of these packages can be recycled? Share the information we learned when we researched our community’s recycling rules. Which of these packages can be reused? Can we find examples of sustainable packages? How can we tell?
6. Each student choose one package to study in more detail. Ask them:

* What is the purpose of this package?
* What materials were used to make this package?
* What might happen to this package after the product is used?

Then the Package Investigation Worksheet is hand out and students are ask to fill it out (this will take about 10 minutes).

1. Come back together as a group and share some of the information from our worksheets. What have we learned about our packages? What can we say about packaging in general? Use the KWL chart and fill in the last column “Learn”. What have we learned about packages that we hadn’t known before? Does any of this new information differ from what we originally had thought?

Wrap Up and Reflect: Ask students to recall the new vocabulary they learned in the lesson. Have them reflect on the meaning of a life cycle as applied to the life of a package. Can they remember the stages of a package’s life cycle? What does it mean to be sustainable? Can they provide examples of sustainable packaging? Why is it a good idea to buy products that use sustainable packaging? What is recycling? How is recycling done in your community? Ask them to think about the package they studied. Was it a sustainable package? What could they do to make that package more ecologically friendly?

Extend: As a class, we will set up a recycling center in our classroom. Then designate an area of our classroom for recycling, Sort the packages that can be recycled. Teach my students to identify the recycling symbols that indicate a package can be recycled. We may designate an area for packages that can be reused and create criteria for reuse. Invite the custodian into our classroom to talk about the recycling program that already exists in your school building, if any does. What gets recycled and what doesn’t? How does it work? We will plan a trip to visit a recycling center if one is nearby. Put up classroom programs that provide an up close and personal look at the recycling process and the mountains of trash on its way to becoming treasure.





**Lesson 2 –The Lunch Weigh-In Description:** In this lesson students will find out that lunch is not all sandwiches, apples and chocolate chip cookies. Packaging makes up a large portion of students’ lunches. Your students will discover exactly how much.

**Learning** Objectives:

• Students will recognize that they are contributing to the garbage problem by using disposable lunch bags

• Students will use skills such as observation and measurement to estimate the amount of waste they generate

• Students will brainstorm ways to reduce their lunchtime waste

Overviews: Parents love things that are convenient – it makes their busy lives a little easier. But many parents pack their children’s lunches using single-serving containers and non-recyclable items such as juice boxes and plastic sandwich bags. Much of the nation’s trash comes from packaging from our food. Lunches make up a significant proportion of that trash. On average, children who take lunches to school in disposable containers with single-use packages make 67 pounds of waste every school year per child. That ends up totaling about 18, 760 pounds of garbage from lunch per year for just one average-size elementary school!

This is an easy problem to fix. Lunches can be packaged in reusable containers that can be taken home, cleaned, and used again. Students can use reusable lunch bags and water bottles. Items that cannot be used again can be brought home and cleaned and recycled. But first children need to become aware of this problem a problem that they themselves are contributing to but one that they can also help to fix.

What We Need

* Students’ regular lunches
* Classroom scale(s)
* Chart paper and writing paper
* Pens and pencils
* Lunch Detectives chart

**Pre-Activity:** (before the Lesson Begins)

Talk to students about how much garbage they think they are responsible for producing. Ask them to brainstorm when it is that they might be responsible for creating all that garbage. Ask them if they think their lunches are environmentally friendly or a source of extra garbage. Explain that it is better to produce less garbage. Once garbage is produced, if it is not recycled, it ends up in landfills or incinerators. Garbage in landfills stays around for a long time without breaking down, and many landfills are no longer accepting new garbage. Also, landfills can leak waste into the water running below it. This can pollute a community’s water supply. Incinerators burn garbage and pollute the environment by leaking poisons into the air.

**Lesson Activities (Students are grouped to complete their tasks/works)**

1. Before lunchtime, students are asked to weigh their lunch bags. Hand out the Lunch Detectives chart and have them follow the directions on their worksheets. They will start by filling in their lunch weights. You can work as a group by taking turns helping each other weigh. Students who purchase lunch from the school cafeteria to do the same if possible.
2. As you unpack your lunch bags, continue to fill in your charts, recording the types of packaging you find in your lunches.
3. Ask students to sit together during lunch and discuss ways that they can protect the Earth from too much garbage. Ask them to brainstorm what they can do to use less packaging and make less garbage.
4. When lunch is over, students will continue to follow the directions on their Lunch Detectives chart. They will weigh what’s left over after they take out any reusable containers or food waste. Are they left with plastic bags? Foil wrappers? Paper bags? Students will fill in the final weight. That number represents the amount of disposable packaging produced by your students’ lunches.
5. Then have them do the math to subtract the end weight from the beginning weight. The result represents how much of the lunch is actually food.
6. Was the weight of the food greater or less than the weight of the packaging? If the weight of the packaging was more, that’s a good indication that there is too much packaging in the lunches. They can tally their scores and find out what kind of lunches they have.

Wrap Up and Reflect: As a class students compare results and discuss. By answering these questions. Who had the least waste? What was the weight of that lunch? What was in it? What kinds of packages accounted for most of the packaging waste? What ideas do students have for cutting down on their lunch garbage?

Extend: Students will be asked to try this activity again a week later. This time they will be given advanced warning. Now that they’ve had a chance to reflect on this activity, they will assess each other to inquire are they and their parents able to create a lunch that makes less waste? Weigh in again and find out if students have learned how to have a healthy lunch for their bodies as well as the Earth.



Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Class: \_\_\_\_\_\_\_\_\_\_\_\_Date:\_\_\_\_\_\_\_\_

A. Weigh your lunch before you eat.

How much does it weigh?

After lunch it’s time to weigh your garbage!

B. Weigh your lunch after you eat.

(Don’t weigh any packages or bottles that you will re-use another day. Don’t weigh any food leftovers, such as apple cores).

How much do they weigh?

Score Sheet

Give yourself 10 points for every reusable package in your lunch. points

If you had no packaging garbage left over at all,

give yourself 20 points. points

If “B” weighed less than one quarter of “A”, give yourself 10 points. points

If “B” weighed less than one half of “A”, give yourself 5 points points

If “B” weighed one half or more than “A”, give yourself 0 points points

Score Sheet Total

Now add up your points points

How Did You Do?

0-5 points: You are a Mystery Meat Garbage Special -- research how to

pack your lunch with fewer packages and try again.

6-10 points: You are a Three-Day Old Blue Cheese Salad – you can do

better. Figure out how to use fewer packages.

11-20 points: You are a Fresh Fruit Cobbler in a Recycled Box – good job

using less packaging.

21 points or more: You are a Five Star Lunch – show off your lunch bag and take a bow.

**Lesson 3 –The Trash Pie Description:** In this lesson students will monitor classroom garbage to find out what makes up most of the waste in the class. They’ll measure the data and create a classroom pie chart to share the trashy results.

**Learning Objectives:**

• Students identify the different kinds of garbage that are thrown away in the classroom

• Students compare and contrast classroom garbage to garbage produced at home

• Students brainstorm ways to reduce classroom garbage

• Students develop presentations to communicate information about garbage types

**Overview:** A certain amount of packaging is necessary to protect products and to keep food from going bad. But not all packaging is equal. Some products need only a small amount of packaging to protect them and other products need no packaging at all. Where packaging is discarded is also not equal. f there are not options for recycling. Can you recycle your water bottle at the mall? Do you recycle your newspapers at home?

Students have a lot of control over what gets discarded in their classroom. They can try to choose products with less packaging and they can try to reuse the packaging garbage they create. But the first step to becoming a more sustainable user is to become aware of packaging garbage they create.

What We Need

* Classroom garbage
* Tables or desks covered in newspaper
* Paper
* Markers
* Latex gloves (optional)

**Pre-Activity:** (before the Lesson Begins)

Have the class brainstorm the type of garbage they think they produce at school. List some ideas on a chart. How much of that garbage do they think is packaging? Tell them that well over half a typical pile of garbage is made up of packaging.

**Lesson Activities (Students are grouped to complete their tasks/works)**

1. Students are asked to put on the latex gloves. Gloves are optional but we might be better of wearing them since we may be encountering food wastes, broken ink pens, newspapers, and other messy items. Then, we can lay newspaper on our worktable to protect our classroom furniture as well.
2. Now we can take turns going over to the classroom garbage, picking out an item, and placing it on the worktable. We can leave food garbage in the wastebasket if possible. Though food may make up a large proportion of classroom garbage, the amounts can be discovered through observation alone.
3. When we are finished going through the garbage and sorting the items, stand around the worktable to discuss the findings. Ask questions to generate discussion.

**Questions can include:**

* What do you notice about the garbage?
* Is there more garbage than you expected?
* About how much of the garbage consists of packaging waste?
* What kinds of packaging do you see?
* What are the types of products that the packages were designed to protect?
* What materials do the packages consist of most frequently?
* Can any of these packages be reused? If so, how?
* Were all these packages necessary? If not, what else could have been done to protect the product?

1. Students our plan today is to sort the garbage into piles that go together. Any suggestions of the types of categories to sort the garbage in to. The class is guided to come to a consensus about the categories and then allow them to move the garbage around so it is in the categories the class defined.
2. Demonstrate to students how to draw a pie chart by drawing a sample pie chart on the board. The sample pie chart was about another topic, the number of boys and girls in the class and the types of sports played by our students.
3. Paper and markers are giving to students. Then, each student is instructed to draw a pie chart representing the types of garbage that our class throws out. We can put all non-packaging garbage into one category in order to focus in more detail on just the packaging garbage. We can use approximate numbers and sizes or be very specific with our ideas.
4. When students have completed the pie charts, ask for volunteers to share their work. Are there any differences between the different pie charts? Did we come to similar conclusions or did any discover different information?

Wrap Up and Reflect: What did we learn about our garbage habits at school from studying the classroom garbage? Were we surprised by the quantity of packaging in the garbage? Do we believe our home garbage would have more packaging or less? What ideas do we have for reducing the amount of garbage that our classroom generates?

Extend: Ask students to draw pie charts representing their home garbage. Make sure we limit our investigation to the garbage in our rooms or in the kitchen so parents do not feel that their privacy is being invaded. Work with them to compare the two pie charts and form hypotheses about the differences.

**Final Point (sharing with other fellow students, the School and community):** Students are asked to work together to create a poster campaign. Each group will focus on one area they researched and create a poster that explains the problem and steps taking toward resolving the problem. Encourage people to stop littering. Remind them that the posters can also provide a positive message about what can be done to keep on improving our situation.

**Related background** reading: Article from http://www.sciencejournalforkids.org

Radworks.org

**Related documents**: Video from YouTube How to pack a Zero Waste Lunch/Back to School Zero Waste Style

**Related links:** [**www.greening**](http://www.greening) **school.org**

**www.n.c.gov/zws**